when the unthinkable happens: chemical site emergencies – unique risks!

Presented by:

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Before We Get Started:

- Emergency Procedures.
- Courtesy Procedures:
  - Restrooms.
  - Snacks.
  - Cell Phones/Videos!
  - Questions?

Introductions

- Who/What You Are!
- Experience at NBC Processes or Responses.
- Expectations/Take Away's!
  - Class Take Away's – Acute Actions!
  - Knowledge Take Away's – Long Term Planning!

Introductions

COCCIARDI
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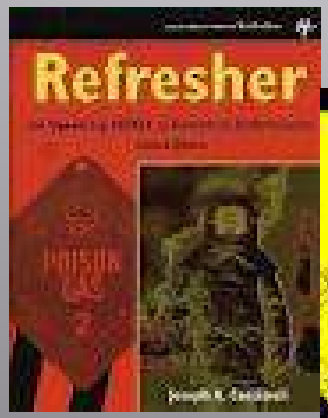
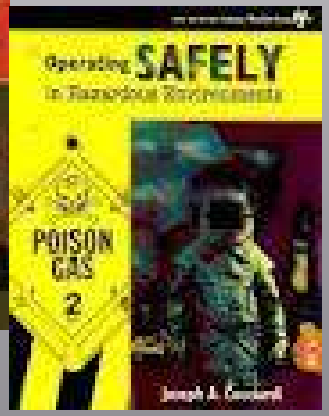
Safety • Environmental Health • Emergency Preparedness
Consulting and Training





NFPA National Fire Protection Association

ASTM INTERNATIONAL

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

APHA

ASSE

NATIONAL SAFETY COUNCIL

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

AIHA
Protecting Worker Health

Course Goal

Course Goal:

- Reduce or eliminate responder morbidity/mortality at Chemical Process Sites (NBC) through cooperative public safety/industrial safety efforts.

VIDEO #1: TWENTY YEARS WITHOUT JUSTICE: THE BHOPAL CHEMICAL DISASTER [http://www.5min.com/Video/The-Bhopal-Gas-Tragedy-119994557] (BEFORE).

General Questions

- “What is different about the NBC “Emergency Response?”
- “What/Where are Chemical Storage (NBC) or Processing Plants of Concern?”
- “What are their Characteristics?”
- “How do we respond safely?”
- “How do we evaluate our response in REAL TIME?”

Outline

Section 1: Introductions to Disaster Response:

- Types of Sites/Types of Incidents.
- "How We Got Here".
- What's Different About the Process Safety Response?

Section 2: "The Specifics":

- **RULES**:
  - CERCLA/SARA.
  - PSM/RMP.
  - Commodity Flow.
  - CFATS.
  - "THE OTHERS".

Outline

<u>Section 3: Response Safety</u>:

Analysis: “What We Have”.

- **RISK:**
  - Safety Considerations.

Implementation: How We Stay Safe”.

- **RESPONSE.**
- **REVIEW: “How We Evaluate the Response”.**

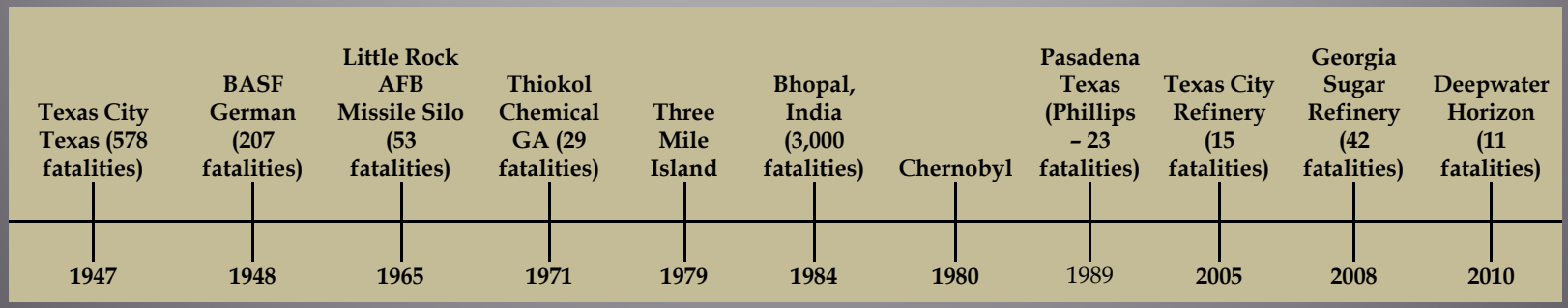
Objectives (At the Completion of this Session…)

- Identify Historical Concerns for NBC Process Safety.
- Know/Key Regulations and Requirements for NBC Sites.
- Identify your Community Sites where Process Hazard Concerns Exit, and Types of Emergencies Expected.
- Develop Key Planning Concepts for Response Actions.
- Evaluate Response Activities – During the Response.

Introduction: Emergency Response – NBC Process Emergency Response

- Industrial Development ⟶
  - Industrial Accidents ⟶
    - Industrial Regulations

Introduction: Emergency Response – NBC Emergency Response



Introduction: Emergency Response – NBC Emergency Response

- 1976: U.S. DOT.
- 1977: U.S. DOE.
- 1980: Comprehensive Environmental Response Cooperation and Liability Act (Superfund).
- 1986: Superfund Amendments and Reauthorization Act Title I, II, III (EPCRA), IV.
- 1990: Clean Air Act Amendments.
- 2002: Public Health Security and Bioterrorism Preparedness and Response Act.
- 2007: Chemical Facilities Antiterrorism

Introduction: Emergency Response – NBC Emergency Response

- "What's Different About the "NBC" Chemical Process Emergency Response?"

- Hazardous Substance
- Hazardous Material
- Toxic Material
- Hazardous Process (Effectively Pressure/Temperature and/or Volume).
- Radiological Hazard (Ionizing/Non-Ionizing).
- Biological Hazard.

VIDEO #2: BLAST WAVE IN DANVERS [http://www.csb.gov/investigations/detail.aspx?SID=14].

Introduction: Emergency Response – NBC Emergency Response

Emergency Response

Introduction: Emergency Response – NBC Emergency Response

Emergency Response


NBC Emergency Response


(Exercise #1: Compare and Contrast EMS Response and NBC Process EMS Response).

(Exercise #1A: Event Differences).

(Exercise #1B: Response Differences).

Section 2: "The Specifics"

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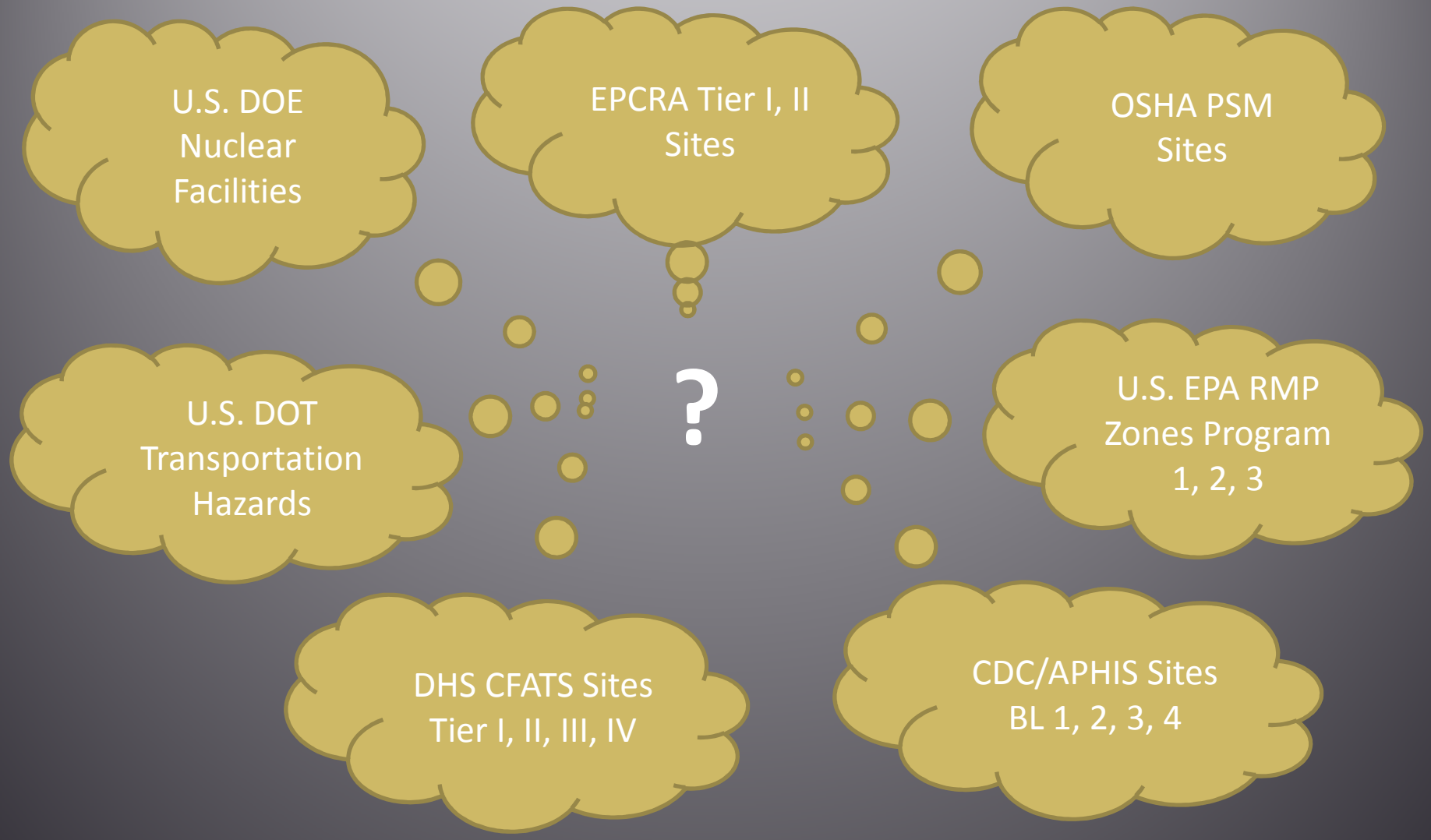
"What and Where are Chemical Storage and Processing Plants of Concern?"

"What are their Characteristics?"

NBC Process Hazards



U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

U.S. EPA: Emergency Planning and Community Right to Know Act (1986):

- Emergency Planning.
- Emergency Release Notification.
- Hazardous Chemical Storage Reporting.
- Toxic Chemical Release Inventory.

U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

Emergency Planning:

- SERC: LEPC.
- SEPC: Oversee implementation of LEPC actions.
- LEPC: Develop emergency plans/preventative Programs for local sites.

U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

Chemical Reporting Requirements:

- Emergency Planning Notifications.
- Emergency Release Notifications.
- Hazardous Chemical Storage Reporting.
- Toxic Release Inventory.
- Trade Secrets (Exemptions).

U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

Covered Facilities: If you have OSHA/MSDS for:

- Extremely Hazardous Substances (TPQ or 500 lbs).
- 75,000 Gallons (retail) UST – Gasoline.
- 10,000 Gallons (retail) UST – Diesel.
- 10,000 lbs – All other hazardous chemicals.

U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

- Reporting to SERC; LEPC; Local Fire Departments (MSDS and inventory).
- Tier I or II Forms: Chemical name/common name; amount on site; storage description; location at the facility; (withholding of information requirements).

U.S. EPA: Emergency Planning & Community Right to Know Act (1986)

1) Chemical (Not Process) Centric!

Clean Air Act Amendments

Clean Air Act Amendments: 1990:

- Process Safety Management Program (OSHA).
- Risk Management Program (EPA).
- Chemical Safety Board (Independent).

Process Safety Management

Process Safety Management: 29CFR1910.119:

- Evaluation of Specific Chemical Processes (Relative to Onsite (Employee) Safety).
  - 10,000 lbs of Flammable Liquid/Gas.
  - Process Activities Involved in Manufacturing of Explosive/Pyrotechnics.
  - 137 Toxic and Highly Reactive Chemicals (above TPQ).

*Except for Hydrocarbon Fuels.

PSM Facility Compliance Requirements

PSM Facility Compliance Requirements (Written Plans): 11 Areas:

1) Employee Participation Plan:
   - Chemical Information.
   - Process Technology Information.
   - Process Equipment Information.
   - Good Engineering Practice Information.

PSM Facility Compliance Requirements

2) Process Hazard Analysis (PHA):
   - "What If" Analysis.
   - Checklist Analysis.
   - Fault Tree Analysis (FTA).
   - Failure Modes and Effects Analysis.

*Updated every five (5) years.

PSM Facility Compliance Requirements

3) Written Operating Procedures:
   - Start-Up.
   - Normal Operations.
   - Temporary Operations.
   - Emergency Operations/Emergency Shutdowns.
   - Normal Shutdowns.
   - Re-Start Procedures After (Emergency/Normal) Shutdowns.

PSM Facility Compliance Requirements

4) Employee Training:
   - Safety and Health Hazards, Emergency Procedures, Safe Work Practices.
   - Refresher: Triennially.
5) Contractor/Sub-Contractor Programs:
   - Equal Requirements.

PSM Facility Compliance Requirements

6) Pre-Start Up Safety Review:
   - Confirm Design Specification have been met.
   - Confirm Safety, Op Procedures, Training.
7) Mechanical Integrity:
   - Protocol to Maintain Mechanical Integrity.
   - Training for Maintenance Activities.
   - Inspection/Testing Procedures.
   - Hot Work Permitting.
   - Management of Change System.

PSM Facility Compliance Requirements

8) Management of Change (to the process):
   - Replacement in Kind Exemption.
9) Incident Investigation (for catastrophic releases and near misses):
   - Initiated Within 48 Hours or Incident.
   - Team Investigation: One (1) Member Familiar with Process.
   - Report of Findings – Written.
   - System to Address Findings.

PSM Facility Compliance Requirements

10)Emergency Planning and Response:

- Emergency Action Plan.
- HAZWOPER Requirements.

11)Compliance Audits:

- X3 Years.

U.S. Environmental Protection Agency: Risk Management Programs

U.S. Environmental Protection Agency: Risk Management Programs:

- Evaluation of Chemical Safety Processes Relative to "Community Safety":
  - Regulated Toxic Substances at TPQ for Each of 77 Substances Identified:
    a) Mandated by Congress.
    b) Environmental Hazards Listed.
    c) Toxic Gas.
    d) History of Releases of Hydrogen Chloride.
    e) History of Releases of Sulfur Trioxide and Sulfuric Acid.

U.S. Environmental Protection Agency: Risk Management Programs

- Regulated Flammable Substances at TPQ for each 63 Substances Identified:
  a) Mandated by Congress.
  b) Flammable Gas.
  c) Volatile Flammable Liquid.

EPA - RMP

EPA – RMP: Three (3) Key Elements:

1) Hazard Assessment.
2) Prevention Program.
3) Emergency Response Plan.

EPA - RMP

Three (3) RMP Programs:

Program 1: Processes that do not pose any offsite risk to the nearest neighbor or habitat (and no accidental release in last five (5) years).

Program 2: Processes that do not fall under Program or Program 3.

Program 3: Process which falls under OSHA-PSM (or if the SIC code is listed) (10 SIC (e.g. Nitrogen Fertilizer Manufacturing).

*Electronic submittal to U.S. EPA prior to start-up and every five (5) years.

Compliance: Program 1

Program 1:

Step 1: List substances involved.

Step 2: Worst case scenario analysis.

Step 3: Accident history review.

Step 4: Coordinate emergency response with Community Group.

Step 5: Document worse case scenario.

Step 6: Program 1 Certification.

Compliance: Program 2

Program 2:

Step 7: Complete a formal hazard assessment.

Step 8: Management system development.

Step 9: Implement Prevention Program (safety information, hazard review, operating procedures, training, maintenance, incident investigation, compliance audit).

Step 10: Implement an Emergency Response Program.

Compliance: Program 3

Program 3:

Step 11: Implement a Program identical to PSM.

*Review and re-submittal every five (5) years.

Transportation: U.S. DOT/Pipeline & Hazardous Materials Safety Administration

Transportation: U.S. DOT/Pipeline and Hazardous Materials Safety Administration:

- Hazardous Materials Commodity Flow Studies:
  - 2,200,000,000 tons shipped in the United States annually.
  - 54% over roadways.
  - 28% over pipelines.
  - 7% over waterways
  - 6% over railways.
  - .02% over air transport.

HazMat Commodity Flow Studies

- Collection and Review of Baseline Information:
  - Previous Emergency Response Planning Documents.
  - Modes and Routes of Transportation.
  - Facility, Population and Infrastructure Locations.
  - Incident and Accident Information.

HazMat Commodity Flow Studies

- Collection and Review of Existing Data:
  - Locally Available Data Services (Agencies, Facilities, Carriers, Trade Associations, Maps, Journals).
  - Electronic Databases and Reports.

- Collection and Validation of New Data:
  - Interviews.
  - Field Data Collection

HazMat Commodity Flow Studies

- Analysis of Data:
  - Ten (10) HazMat Flows.
  - Ten (1)) Risk (High Risk or Environmental Sensitive Hot Spots).
  - Summarize Information.
- Disseminate Information and Communicate.
- Apply Results.

HazMat Commodity Flow Studies

- Conclusions and Recommendations:
  - Awareness.
  - Minimum/Maximum Scenario Definitions.
  - Emergency Planning.
  - Comprehensive Planning.
  - Equipment Needs
  - Resource Scheduling.
  - HazMat Route Designation.
  - Legal Takings (Litigation – Eminent Danger).

What Else Do/Can We Know

- U.S. DHS: Chemical Facility Anti-Terrorism Standards (CFATS):
  - HHS-CDC/APHIS: Select Agent Facilities.
  - HHS-CDC/APHIS: Bio Safety Level 3 or 4 Facilities.
  - U.S. DOE: Licensed Facilities and Sites.

What Else Do/Can We Know

- U.S. DHS: Chemical Facility Anti-Terrorism Standards:
  - CST Top Screen Process (Chemicals of Interest [16 pages] (CFATS) [2007].
  - Initial Tier (1-4).
  - CSAT: Security Vulnerability Assessment.
  - Final Tier Assigned by DHS.
  - CSAT: Site Security Plan or Alternate Security Plan.

What Else Do/Can We Know

- U.S. DHS: Chemical Facility Anti-Terrorism Standards:
  - Site Security Plan:
    - Security Vulnerability Issue.
    - On/Off Site Emergency Response Capabilities.
    - Facility Security Measures.
    - Asset Security Measures.

What Else Do/Can We Know

- HHS: U.S.D.A. Possession, Use and Transfer of Select Agents [Severe Threat to the Public, Animal or Plant Health; Animal or Plant Products] (APHIC/CDC):
  - HHS Agents – 31.
  - U.S.D.A. Veterinary Agents – 24.
  - U.S. D.A. Plant Protection/Quarantine Agents – 9.
  - Overlap Agents – 10.

What Else Do/Can We Know

- HHS – Bio Safety Levels (BSL 1-4 or P1 – P4):
  - BSL 1 – (P1): Well Characterized Agents /No Consistent Disease Calculation.
  - BSL 2 – (P2): Moderate Hazard to Personnel and the Environment.
  - BSL 3 – (P3): Indigenous or Exotic Agents Which Cause Serious or Potentially Lethal Disease After Inhalation.
  - BSL 4 – (P4): Dangerous/Exotic Agents – High Rate of Aerosol Transmissions – Vaccines or Treatments Unavailable.

What Else Do/Can We Know

- BSL-3: [Mycobacterium TB; Bacillus Anthracis]:
  - Physical Design/PPE/Personal Vaccinations and Hygiene Requirements: Negative Pressure/Filtered.
- BSL-4: [Hemorrhagic Diseases; Ebola; Smallpox]:
  - Multiple Redundant Physical Requirements/PP-PPE Requirements (Virginia Sites (X2)).

How does RMP help answer our response questions???

What will apply to your community?

EXERCISE #2

YOUR JURISDICTION			
Facility / Site	**Reason for Listing**	**How We Respond (Differently)**	**Safety Considerations**
1) _____ 2) _____ 3) _____	1) _____ 2) _____ 3) _____	1) _____ 2) _____ 3) _____	1) _____ 2) _____ 3) _____

(Exercise #2)

Section 3: Response Safety

Section 3: Response Safety:

- The Chemical Safety Board: 10 Years of Success.

Note: Review this Slide – Show the Chemical Safety Board: 10 Years of Success Video)

VIDEO #3: THE CHEMICAL SAFETY BOARD: 10 YEARS OF SUCCESS [http://www.csb.gov/videoroom/detail.aspx?vid=29&F=0&CID=1&pg=1&F_All=y].

- ❖ Independent "Expert" Board (Not OSHA or EPA Affiliated).
- ❖ Identifies Regulatory Requirements and Needs.
- ❖ Documents and Recommends Best Practices.

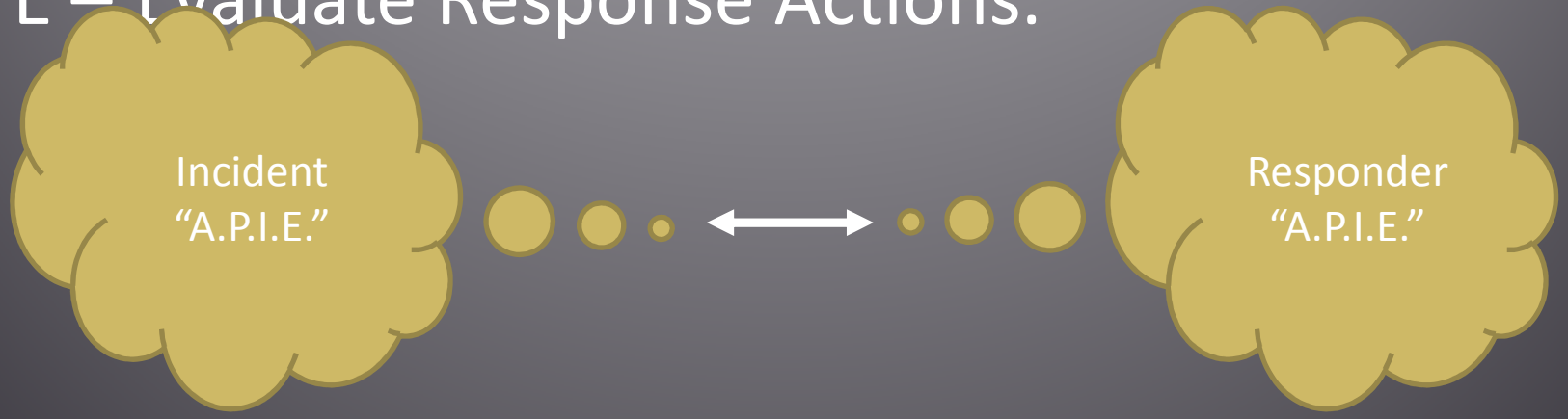
How Do We Evaluate the Response (Did We Respond Differently)

A – Analyze the Incident.

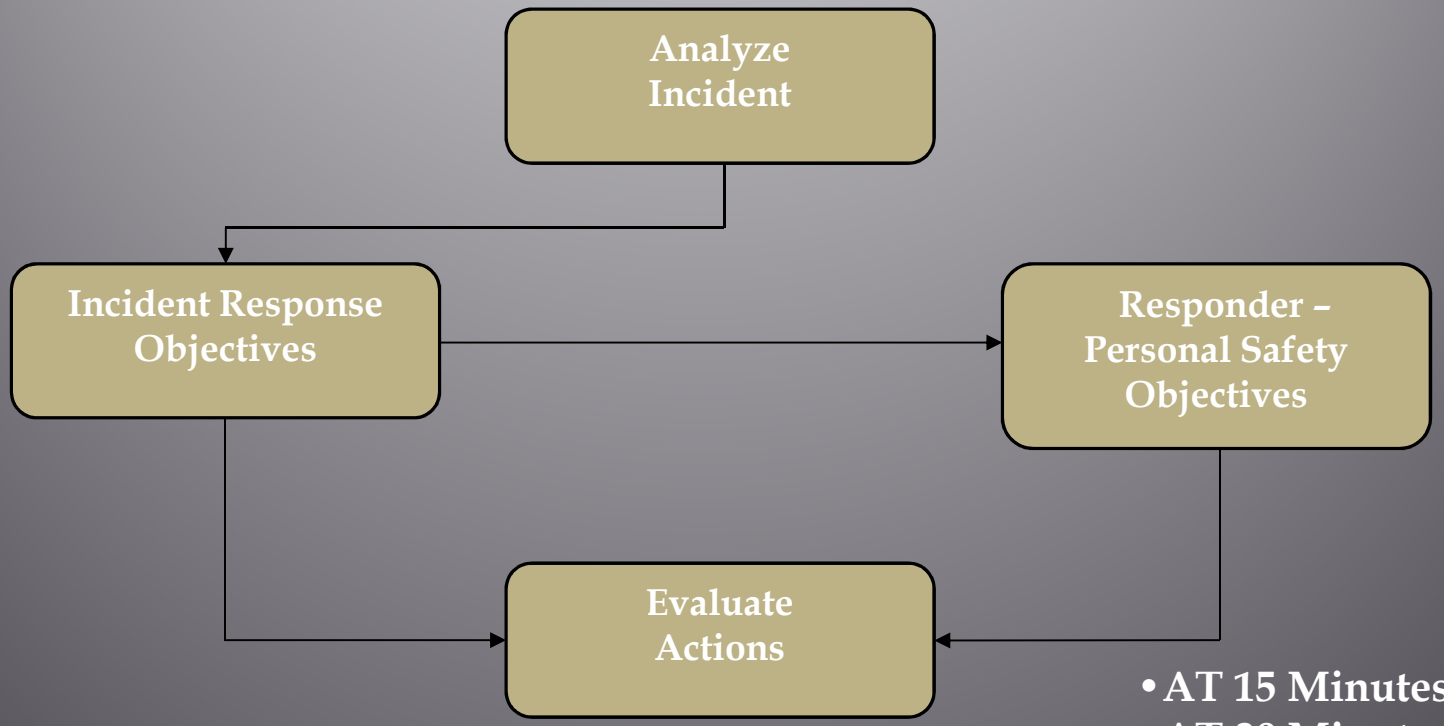
P - Plan Response Objectives.

I – Implement Response Objectives.

E – Evaluate Response Actions.



EXERCISE #3: Danversport Response



- AT 15 Minutes
- AT 30 Minutes
- AT 1 Hour
- AT 1 Day

(Exercise #3)

Final Thoughts…

- “What/Where are Chemical Storage or Processing Plans of Concern?”
- “What are their Characteristics?”
- “What is different about the NBC “Emergency Response?”
- “How do we respond safely?”
- “How do we evaluate our response in REAL TIME?”